IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellants:	Ohira, et al.	)
		) Group Art Unit: 1762
Serial No.:	09/924,826	)
		)
Filed:	August 8, 2001	) Examiner: Fuller
		)
For:	METHOD OF ENERGY CONVERSION	)

Assistant Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

SUPPLEMENTAL APPEAL BRIEF

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is Shishiai-Kabushikigaisha (CCI Corporation).

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals or interferences known to Appellants, Appellants' legal representatives, or assignee that will directly affect, be directly affected by, or have a bearing on the Board's decision in the pending appeal.

III. STATUS OF THE CLAIMS

Claims 1-3, 6, 8-12, 14, 17-22, 24-31, and 33-36 are pending in the application. Claims 1-3, 6, 8-12, 14, 17-22, 24-31, and 33-36 stand finally rejected.

IV. STATUS OF THE AMENDMENTS

A response has been filed subsequent to the final rejection dated July 15, 2005. The response contained no amendments to the claims and the arguments presented in the response were considered by the Examiner as evidenced by the Examiner's response contained in the detailed action attached to the Advisory Action dated November 8, 2005. All prior amendments have been entered.

V. SUMMARY OF CLAIMED SUBJECT MATTER

Independent Claim 1 and Claim 36 are directed to a method of energy conversion. In both independent claims the method comprises applying energy, such as through impact or sound energy, to an energy conversion material. In Claim 1, energy conversion material comprises a base material and a moment activator. The moment activator increases or promotes the amount or magnitude of dipole moment in the base material. (Page 4, lines 22-24) Prior to the application of energy, the energy conversion material has dipoles in a stable state. The application of energy to the energy conversion material displaces the dipoles to an unstable state and the dipoles subsequently return to a stable state, converting the energy previously supplied in the form of, for example, sound or impact energy, to kinetic energy in the form of molecular motion. The magnitude of the dipole moment is directly related to the energy conversion ability of the energy conversion material. (Page 5, lines 18-27) The energy conversion material is in

the form of a sheet, fiber or combination of sheet and fiber. (Page 4, lines 8-12, Page 83, line 4 to page 84, line 11) When the energy conversion material is in the form of a sheet or a combination of a sheet and a fiber the sheet has a thickness of 1 millimeter or greater.

Independent Claim 36 comprises applying vibrational energy to a vibration damping material, comprising an acrylic rubber (a specific base material) and a specific moment activator (DCHBSA).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-3, 6, 8-12, 14, 17-22, 24-31, and 33-35 stand rejected under 35 U.S.C. 112, first paragraph.

Claims 1-3, 6, 8-12, 14, 17-22, 24-31, and 33-35 stand rejected under 35 U.S.C. 112, second paragraph.

Claims 1, 2, 6, 8, 12, 14, 17-22, 25-27, 29-31 and 33-36 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over United States Patent No. 5,439,512 to Kamijima et al (Kamijima).

Claims 1-3, 6, 8-12, 14, 17-19, 21, 22, 25-27, 29-31, and 33-36 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over United States Patent No. 4,430,466 to Cooper (Cooper) in view of United States Patent No. 5,858,521 to Okuda et al. (Okuda).

Claim 24 is rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Cooper in view of Okuda and further in view of United States Patent No. 4,602,054 to Kang et al. (Kang).

Claim 28 is rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Cooper in view of Okuda and further in view of United States Patent No. 4,218,349 to Minatono et al. (Minatono).

Claims 1-3, 6, 8-12, 14, 17-19, 21, 22, 25-27, 29-31, and 33-35 stand rejected under under 35 U.S.C. § 103(a), as allegedly unpatentable over Okuda.

Claim 24 stands rejected under under 35 U.S.C. § 103(a), as allegedly unpatentable over Okuda in view of Kang.

Claim 28 is rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Okuda in view of Minatono.

VII. ARGUMENT

Claims 1-3, 6, 8-12, 14, 17-22, 24-31, and 33-35 comply with the written description requirement. In the Advisory Action, the Examiner has asserted that there is no support for the range of 1 millimeter or greater. Applicants respectfully disagree. As stated before, the lower limit of 1 millimeter find support at least at line 5 of page 79 and line 1 of page 81. Further support for the lower limit can be found at page 83, line 6. Support for sheets having a thickness greater than 1 millimeter can be found at least on page 94, lines 13-16.

Claims 1-3, 6, 8-12, 14, 17-22, 24-31, and 33-35 are not indefinite. Applicants wish to thank the Examiner for explaining more fully his position regarding the indefiniteness rejection. Applicants maintain that the phrase, "and the sheet has a thickness of 1 millimeter or greater" would readily be understood by one of ordinary skill in the art to describe a sheet having a thickness of 1 millimeter or greater. If fibers are present in the sheet it would be understood that the thickness limitation would apply to the sheet and fiber combination. If the fiber had a diameter less than 1 millimeter then the thickness of the sheet would be greater than the diameter of the fiber and the limitation would apply to the combination of sheet and fiber. If the fiber or combination of fibers had a thickness greater than 1 millimeter when used in the combination of a sheet and fiber then the limitation is still definite since it includes thicknesses greater than 1 millimeter. However, if the Examiner is still uncomfortable with this language, Applicants suggest that the language could be altered, potentially to read "sheet, fiber or combination thereof wherein the sheet or combination of sheet and fiber has a thickness of 1 millimeter or greater."

Claims 1, 2, 6, 8, 12, 14, 17-22, 25-27, 29-31 and 33-36 are unobvious in view of United States Patent No. 5,439,512 to Kamijima et al (Kamijima).

Kamijima teaches a composition of an anti-fouling paint that uses acrylic rubber with DCHBSA. The Examiner has asserted that the paint reads on the instantly claimed sheet because once the paint is applied, particularly on a broad surface, it becomes a sheet. The paint of Kamijima results in a coating having a thickness of 50 micrometers (Col. 20, line 34) to 100 micrometers (Col. 23, line 16).

In making the obviousness rejection the Examiner has stated "to determine the thickness required such that sufficient anti-fouling property is supplied to the hull and reapplication is

required least often would have been obvious at the time the invention was made to a person having ordinary skill in the art through routine experimentation." (Office action mailed 7/15/2005, page 5).

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing a prima facie case of obviousness. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). Establishing a prima facie case of obviousness requires that all elements of the invention be disclosed in the prior art. *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970).

Firstly, Kamijima does not disclose the claimed thickness and hence a prima facie case of obviousness has not been made. Additionally, the Examiner has asserted that the claimed thickness would be obvious in order to reduce reapplication of the paint. The Examiner is asserting that increasing the thickness of Kamijima by ten fold or more is "routine experimentation". Applicants respectfully assert that there is no support for this assertion as thicker does not necessarily translate to better adhesion with regard to paint, particularly marine paint. Increasing paint thickness when applied to the hull of a boat increases drag and hence decreases performance – particularly speed and fuel economy. Furthermore there is no support in Kamijima for the concept that a thicker paint would resist barnacle growth better than a thinner paint as the inhibitory effect of the paint on barnacle growth is likely the result of a surface property that would be unaffected by thickness. In addition, there is no support for the idea that a thicker paint would adhere to the hull of a boat better than a thinner paint and hence reduce the need for reapplication. Accordingly, Applicants respectfully assert that the claimed subject matter is patentable over Kamijima because the claimed thickness is non-obvious.

Additionally, Applicants wish to remind the Examiner that the claims are directed to a method of energy conversion comprising applying energy to an energy conversion material in the form of a sheet, fiber or combination thereof, not a paint. While the Examiner has asserted that paint, when dry becomes a sheet, Applicants respectfully assert that there are some essential differences. Paint, when dry, is, at least to some degree, self adhered to a substrate surface. In contrast, a sheet is a free standing article which can be adhered to the surface of a substrate through the use of an additional material such as an adhesive or other means.

Claims 1-3, 6, 8-12, 14, 17-19, 21, 22, 25-27, 29-31, and 33-36 are unobvious in view of Cooper in combination with Okuda. Claim 24 is unobvious in view of Cooper in combination

with Okuda and Kang. Claim 28 is unobvious in view of Cooper in combination with Okuda and Minatono.

Claims 1-3, 6, 8-12, 14, 17-19, 21, 22, 25-27, 29-31, and 33-35 are unobvious in view of Okuda. Claim 24 is unobvious in view of Okuda and Kang. Claim 28 is unobvious in view of Okuda and Minatono.

Cooper discloses a sulfur curable conjugate diene rubber compound formulation containing a silica reinforcing filler and a coupling agent and a benzothiazyl sulfenamide accelerator. (Abstract) As stated by the Examiner Cooper fails to teach the claimed amount of benzothiazyl sulfenamide compounds.

The Examiner has cited Okuda for its teaching with regard to how the degree of vulcanization affects the physical properties of the rubber and how vulcanization is controlled. The Examiner has asserted that Okuda teaches modifying the amount of vulcanizing agents which includes modifying the amount of vulcanizing accelerators. The Examiner has further asserted that "It would have been obvious ... to determine the amount of vulcanizing agents and accelerators in the composition such that the desired degree of vulcanization is achieved. By doing so the vibration dampening property of the tire is maximized." (Office action mailed 7/15/2005, page 6)

Okuda, at Col. 3, lines 21-39, makes a distinction between vulcanization agents such as sulfur and peroxides and vulcanization accelerators such as N-cyclohexyl-2-benzothiazolyl sulfenamide. As understood in the art, vulcanization accelerators affect the curing time but not the amount of cure. The amount of cure is dependent upon the amount of vulcanization agent. In contrast a vulcanization accelerator can reasonably compared to a catalyst which decreases the reaction time of a chemical reaction but does not alter the thermodynamic equilibrium of the reaction (e.g., how much product is formed). Okuda discusses, in Column 5, lines 10-35, the desired rubber viscosity of the viscoelastic layer composition before vulcanization and the modulus of dynamic shearing elasticity after vulcanization. Okuda further teaches that these physical properties can be adjusted by "the types and the added amounts of the above-mentioned vulcanizing agents, softening agents and fillers." (emphasis added, Col. 5, lines 31-35) Okuda does not teach or suggest that the physical properties can be modified by the amount of the vulcanization accelerator. As benzothiazyl sulfenamide compounds such as DCHBSA are

vulcanization accelerators, not vulcanization agents, Okuda does not teach or suggest modification of the amount of vulcanization accelerators to attain particular physical properties.

In addition, the only teaching in Okuda with regard to the amount of vulcanization accelerator can be found in the table in Col. 14. The table teaches 5 parts by weight of vulcanization accelerator which is half of the claimed amount.

Furthermore, Applicants respectfully assert that even if the claimed compound was a vulcanization agent, increasing the amount of agent and hence the amount of vulcanization would not necessarily improve the vibration dampening property of the hypothetical tire. Vulcanization results in chemical bonds being formed between polymer chains and more chemical bonds between polymer chains (cross links) mean more rigidity. Increasing rigidity would decrease the vibration dampening property of the hypothetical tire.

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing a *prima facie* case of obviousness, i.e., that all elements of the invention are disclosed in the prior art; that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references; and that the proposed modification of the prior art had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996).

Applicants respectfully assert that the Examiner has failed to establish a *prima facie* case of obviousness because not all elements of the claimed invention are disclosed in the prior art, there is no motivation or suggestion in the prior art to modify the combined references, and even if the references were modified as suggested by the Examiner there is no reasonable expectation of success.

Kang and Minatono have been cited to provide specific elements of Claims 24 and 28 and do not rectify the combined deficiencies of Cooper and Okuda or the deficiencies of Okuda alone.

In summary, the pending claims are non-obvious over the art of record. For the reasons cited above, Appellants respectfully submit that all of the claims are allowable and the application is in condition for allowance. Appellants respectfully request reversal of the outstanding rejections and allowance of this application.

In the event the Examiner has any queries regarding the submitted arguments, the undersigned respectfully requests the courtesy of a telephone conference to discuss any matters in need of attention.

If there are any additional charges with respect to this Appeal Brief, please charge them to Deposit Account No. 06-1130.

Respectfully submitted,

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VIII. CLAIMS APPENDIX

1. (Previously Presented) A method of energy conversion comprising:

applying energy to an energy conversion material comprising a base material and 10 to 500 parts by weight per 100 parts by weight of the base material of a moment activator selected from the group consisting of N, N-dicyclohexylbenzothiazyl-2-sulfonamide (DCHBSA), 2-mercaptobenzothiazole (MBT), dibenzothiazylsulfide (MBTS), N-cyclohexylbenzothiazyl-2-sulfenamide (CBS), N-tert-butylbenzothiazyl-2-sulfenamide (BBS), N-oxydiethylenebenzothiazyl-2-sulfonamide (OBS), or N, N-diisopropylbenzothiazyl-2-sulfenamide (DPBS), 2-(2'-hydroxy-3'-(3", 4", 5", 6" tetrahydrophthalimidemethyl)-5'-methylphenyl)-benzotriazole (2HPMMB), 2-2'-hydroxy-5'methylphenyl)-benzotriazole (2HMPB), 2-(2'-hydroxy-3'-t-butyl-5'-methylphenyl)-5-chlorobenzotriazole (2HBMPCB), 2-(2'-hydroxy-3',5'-di-t-butylphenyl)-5-chlorobenzotriazole (2HDBPCB), and ethyl-2-cyano-3,3-di-phenylacrylate, wherein said energy conversion material has dipoles in a stable state;

displacing the dipoles to an unstable state; and

returning the dipoles to a stable state wherein said energy conversion material is in the form of a sheet, fiber or combination thereof and the sheet has a thickness of 1 millimeter or greater.

2. (Original) The method of claim 1, wherein the base material comprises a polymer selected from the group consisting of polyvinyl chloride, acrylic rubber, acrylonitrile-butadiene rubber, styrene-butadiene rubber, chloroprene rubber, butadiene rubber, natural rubber, isoprene rubber, and chlorinated polyethylene.

3. (Original) The method of claim 1, wherein the base material comprises:

a polymer selected from the group consisting of polyvinyl chloride, polyethylene, polypropylene, ethylene-vinyl acetate copolymer, polymethyl methacrylate, polyvinylidene fluoride, polyisoprene, polystyrene, styrene-butadiene-acrylonitrile copolymer, and styrene-acrylonitrile copolymer; and

a plasticizer.

4. (Canceled)

5. (Canceled)

6. (Previously presented) The method of claim 1, wherein the moment activator is a compound selected from the group consisting of N, N-dicyclohexylbenzothiazyl-2-sulfonamide (DCHBSA), N-cyclohexylbenzothiazyl-2-sulfenamide (CBS), 2-(2'-hydroxy-3'-(3", 4", 5", 6" tetrahydrophthalimidemethyl)-5'-methylphenyl)-benzotriazole (2HPMMB), and ethyl-2-cyano-3,3-di-phenylacrylate.

7. (Canceled)

8. (Original) The method of claim 1, wherein the energy conversion material further comprises filler.

9. (Original) The method of claim 8, wherein the filler comprises mica scales, glass pieces, carbon fibers, calcium carbonate, barite, and precipitated barium sulfate.

10. (Original) The method of claim 8, wherein the filler is present in an amount of 10 to 500 parts by weight per 100 parts by weight of the base material.

11. (Original) The method of claim 10, wherein the filler is present in an amount of 20 to 80 parts by weight.

12. (Original) The method of claim 1, wherein the energy conversion material is an unconstrained vibration damper.

13. (Canceled)

14. (Previously presented) The method of claim 1, wherein the moment activator is present in an amount of 10 to 100 parts by weight per 100 parts by weight of the base material.

15. (Canceled)

16. (Canceled)

17. (Original) The method of claim 1, wherein the energy is sound energy and the energy conversion material is a sound absorptive material.

18. (Original) The method of claim 17, wherein the base material comprises a polymer selected from the group consisting of polyvinyl chloride, polyethylene, polypropylene, ethylene-vinyl acetate copolymer, polymethyl methacrylate, polyvinylidene fluoride, polyisoprene, polystyrene, styrene-butadiene-acrylonitrile copolymer, styrene-acrylonitrile copolymer, polyester, polyurethane, polyamide, polyvinylidene, polyacrylonitrile, polyvinylalcohol, cellulose, acrylonitrile-butadiene rubber, styrene-butadiene rubber, butadiene rubber, natural rubber, isoprene rubber, chlorinated polyethylene and chloroprene rubber.

19. (Original) The method of claim 17, wherein the moment activator is present in an amount of 10 to 430 parts by weight per 100 parts by weight of the base material.

20. (Original) The method of claim 17, wherein the sound absorptive material further comprises corrosion inhibitor.

21. (Original) The method of claim 17, wherein the sound energy has a frequency of 1,000 Hz or less.

22. (Original) The method of claim 21, wherein the sound energy has a frequency of 500 Hz or less.

23. (Canceled)

24. (Original) The method of claim 17, wherein the sound absorptive material is disposed adjacent to a fiber surface.

25. (Original) The method of claim 1, wherein the energy conversion material is an impact absorptive material.

26. (Original) The method of claim 25, wherein the moment activator is present in an amount of 10 to 200 parts by weight per 100 parts by weight of the base material.

27. (Previously presented) The method of claim 25, wherein the impact absorptive material is foamed or unfoamed.

28. (Original) The method of claim 25, wherein the impact absorptive material is incorporated into a shoe sole.

29. (Original) The method of claim 1, wherein the energy is electromagnetic energy and the energy conversion material is an electromagnetic wave absorptive material.

30. (Original) The method of claim 29, wherein the electromagnetic energy has a frequency of 500 to 2,000 MHz.

31. (Original) The method of claim 29, wherein the moment activator is present in an amount of 10 to 200 parts by weight per 100 parts by weight of the base material.

32. (Canceled)

33. (Original) The method of claim 1, wherein the energy conversion material is a piczoelectric material.

34. (Original) The method of claim 33, wherein the moment activator is present in an amount in the range of 10 to 200 parts by weight per 100 parts by weight of the base material.

35. (Original) The method of claim 1, wherein said energy is selected from the group consisting of vibrational energy, sound energy, impact energy, and electromagnetic energy.

36. (Previously Presented) A method of vibration damping comprising:

applying vibrational energy to a vibration damping material comprising acrylic rubber and 10 to 500 parts by weight per 100 parts by weight of the acrylic rubber of N, N-dicyclohexylbenzothiazyl-2-sulfonamide (DCHBSA), wherein said vibration damping material has dipoles in a stable state;

displacing the dipoles to an unstable state; and

returning the dipoles to a stable state.

IX. EVIDENCE APPENDIX

There is no evidence submitted pursuant to 37 C.F.R. §1.130, 37 C.F.R. §1.131, or 37 C.F.R. §1.132 or any other evidence entered by the Examiner and relied upon by the Appellant in this appeal, known to the Appellants, Appellants' legal representatives, or assignee.

X. RELATED PROCEEDING APPENDIX

There are no other related appeals or interferences known to Appellants, Appellants' legal representatives, or assignee that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.